Current Research

Litter Decomposition and Nutrient Dynamics in Constructed and Natural Wetlands

Mike Schmidt (M.S. candidate) and Dr. W. Lee Daniels of Virginia Tech are studying the decomposition rates of different organic matter sources across a gradient of drainage classes in hydric and non-hydric soils in created wetlands and adjacent natural hydric soils. Effect of arthropod activity and nutrient dynamics are being measured in mitigation and natural forested non-tidal wetlands near Fort Lee and Charles City, Virginia.

Hydric Soil Temperatures and Growing Season Lengths Under Four Different Land Uses

Amanda Burdt (M.S. candidate) and Dr. John Galbraith of Virginia Tech will be studying the effect of land use on hydric soil temperatures and growing season length in a recently (hydrologically) restored area of the Great Dismal Swamp of Southeast Virginia. *This study has been emplaced but is still unfunded.* The three restored treatments will be: Hardwood Mineral Flats forest, former cropland replanted to native trees, former cropland cleared to simulate cropland ground cover and vegetation biomass. We will also measure temperature in adjacent, actively-drained cropland areas. Temperature will be measured at +1m, -15cm, -30cm, and -50cm. Growing season will be recorded for microbes, key indicator hardwoods, herbaceous plants, and common crops by observation and by CO_2 evolution rates.

Analysis of the TF2 indicator in Mid-Atlantic Triassic Basins

John Chibirka, Marty Rabenhorst, and John Galbraith have begun a field study of soils that have TF2 indicators in Mid-Atlantic Triassic Basin soils. The soils in question form in Red Parent materials (see http://www.statlab.iastate.edu/soils/hydric/fieldind/fieldind.html). These soils have a low Color Change Propensity Index, which means they do not produce low chroma depletion zones as readily as other soils (M. Rabenhorst, pers. comm.). The problem soils apparently have the near surface hydrology necessary to produce hydric soil features, yet fail to meet any approved hydric soils field indicators. However, these soils do produce redoximorphic features with oxidation zones of Fe and Mn and depleted zones of chroma 3 or 4. The study will look at Triassic Basin soils in three areas across the Northern Piedmont Region, Land Resource Regions P & S. At each site, we will place an automated water well and automated soil temperature logger in a soil with TF2 features. Wells will also be placed in adjacent soils that are drier, and adjacent soils that are apparently wetter.

Improved Identification, Delineation, And Functional Assessment Of Piedmont Wetlands

Wetland soils perform important functions in filtering excess nutrients and sediments from water, as well as providing habitat for specialized plants and animals. Wetland types result from the interaction of geomorphology, soils, water, and plants and are thus complex in nature and poorly understood. Dr. Bruce Vasilas of the University of Delaware, Dr. Marty Rabenhorst of the University of Maryland, and Dr. John Galbraith of Virginia Tech propose two components of this project that should result in improved evaluation and, therefore, protection of wetlands common to the Mid-Atlantic Piedmont. In one component we would monitor slope wetlands for purposes of functional assessment for HGM development and for the evaluation of existing, test, and potential hydric soil indicators (Figure 1). In the other component, we would monitor flood plain wetlands

for the evaluation of existing, test, and potential hydric soil indicators, and determine why existing hydric soil indicators often fail to develop.

Mitigation Success and Hydric Soil Reconstruction Strategies for the Virginia Dept. of Transportation.

In July, 2001, W. L. Daniels and J. Galbraith (Virginia Tech) and Rich Whittecar (Old Dominion U.) will initiate a new three-year study to (1) document VDOT's relative success rate at recreating hydric soil conditions in their non-tidal mitigation wetlands and (2) determine the effects of organic soil amendments, tillage and other soil reconstruction practices on the restoration of appropriate hydric soil conditions across a wetness gradient in several newly constructed mitigation sites. All VDOT non-tidal mitigation sites constructed in the past 10 years will be surveyed and compared with their nearest and most appropriate reference site. Specific emphasis will be placed upon determination of basic soil and hydrologic relationships within mitigation sites that appear to be related to differences in "success patterns" of hydrophytic vegetation establishment and persistence.

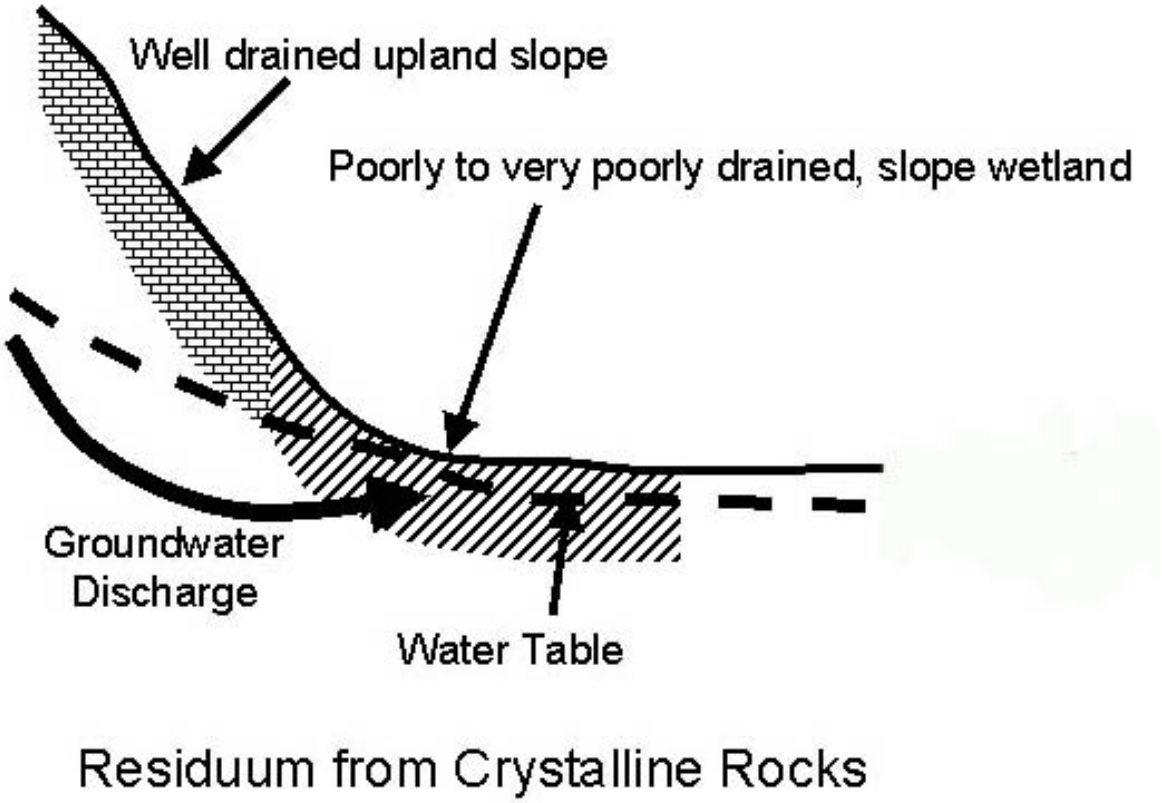

Figure 1. Simplified schematic diagram showing landscape components of a Piedmont landscape including continuous discharge slope wetlands.

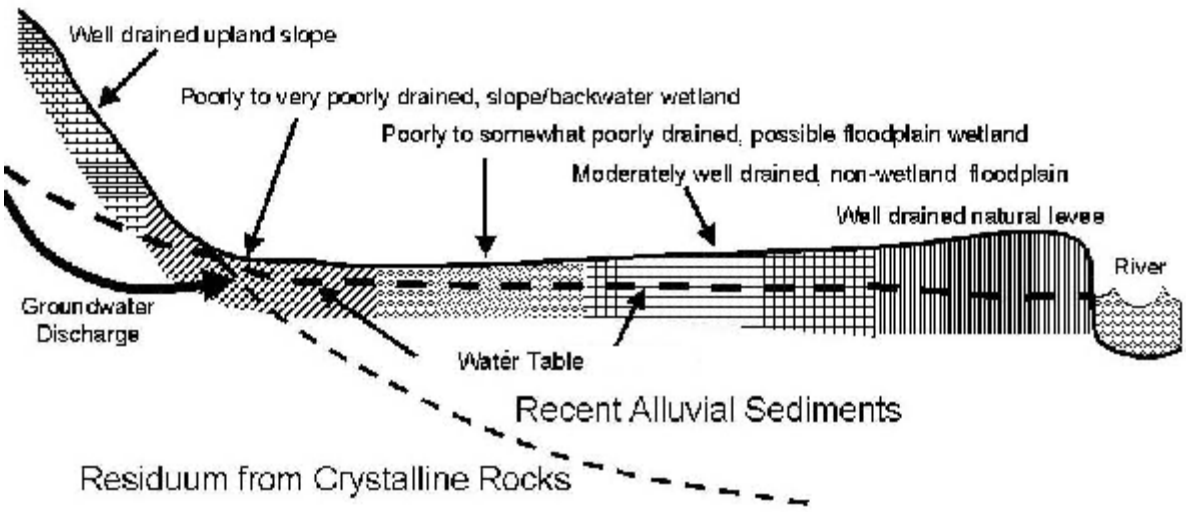

Figure 2. Simplified schematic diagram of components of a Piedmont landscape including seasonal discharge slope and adjacent floodplain wetlands.